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Post-Election Audit Summary

August 7, 2012 Special Election – Issue #1: Shaker Heights Municipal Income Tax

On September 5, 2012 we conducted a Risk-Limiting Post-Election Audit for the August Special Election. A total of 6,651 ballots were cast for the issue between two (2) responses.

Our Risk-Limiting Audit was based upon the Kaplan-Markov method as explained by Philip B. Stark and Mark Lindeman. Auditing best practices recommend we split up the total ballots cast by precinct into multiple batch types. We utilized five batch types each consisting of one single ballot type category: Absentee, Election Day, Provisional, Post Absentee, and Post Election Day.

A master spreadsheet was created with statistical formulas to determine the number of batches that must be audited in order to reach a 90% confidence level. This confidence level means the audit has at least a 90% probability of leading to a full recount if the apparent outcome is incorrect.

We used a “Probability Proportional to Error Bound with Replacement” selection method. We assigned four (4) digit numbers ranging from 0000 through 9,999 for each batch within the contest. Unique ranges of numbers were allocated to specific batches based upon their error bound - i.e. the greater the possibility of a miscount within a batch, the more numbers assigned, and the more likely it is to be selected. To obtain the precinct batch number we rolled four (4) differently colored dice numbered 0 - 9, each one of the colored dice representing one (1) digit of the four (4) digit number. We rolled the dice a total of ten (10) times in order to select batches to audit for the contest.

In conclusion, we audited a total of 1,980 ballots from the Shaker Heights Municipal Income Tax contest in the August 7, 2012 Special Election. All results match the Official Certification giving us a 100% audit accuracy rate for the election.

RACE	TOTAL BALLOTS CAST	REQUIRED BATCHES SELECTED	TOTAL BALLOTS AUDITED	COST
Issue #1: Shaker Heights Income Tax	6,651	10	1,980	\$180.36



Cost Breakdown	
Total Cost of Post-Election Audit	\$180.36
Cost Per Ballot (Ballots Cast in Audited Contest Only)	\$0.027
Cost Per Ballot (Ballots Cast in Entire Election)	\$0.015
Cost Per Precinct (Ballots Cast in Audited Contest Only)	\$7.515

